Trend Study 15-1-04

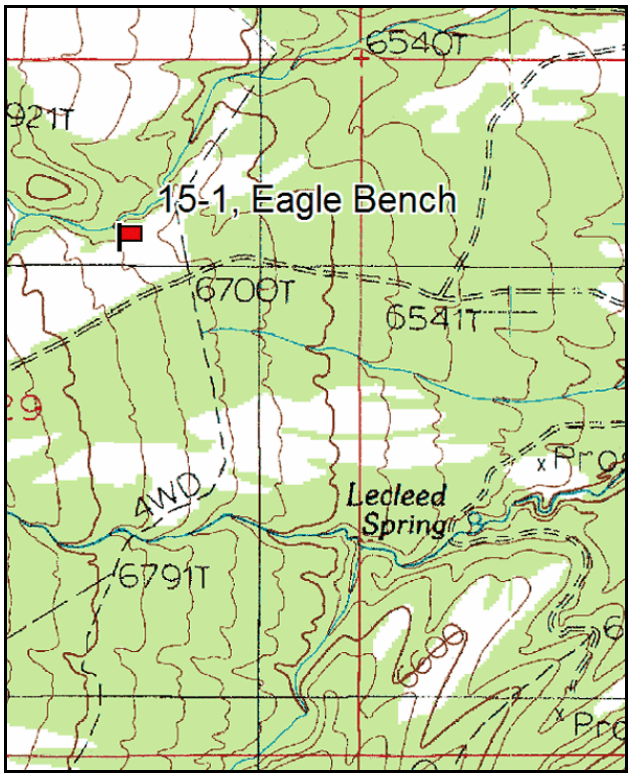
Study site name: Eagle Bench . Vegetation type: Chained, Seeded P-J .

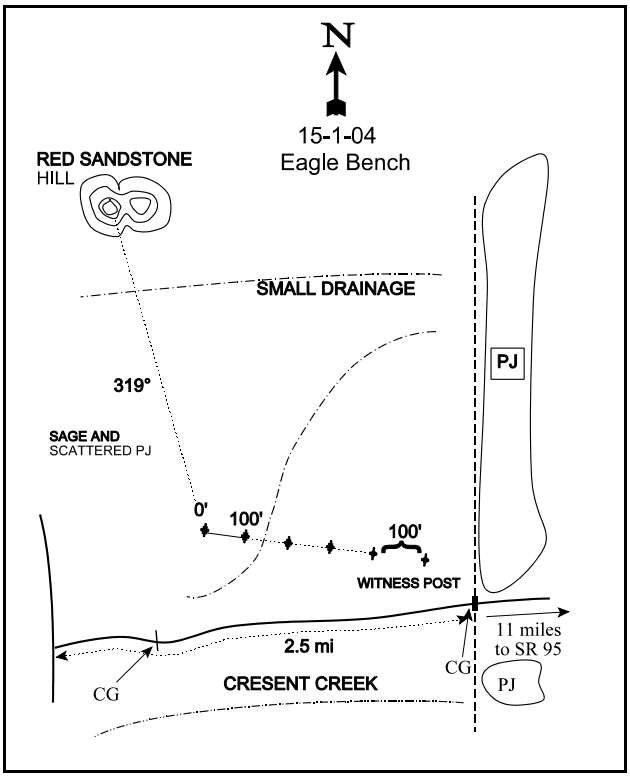
Compass bearing: frequency baseline 95 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

This transect is located in the Crescent Creek chaining on the east side of the Henry Mountains. It can be reached from SR 95 (approximately 11 miles through Little Egypt then west up Crescent Creek) or from the west via Copper Ridge of Granite Ridges and down Crescent Creek. From the intersection in the north part of Section 36 (T 31S, R 10E), go 0.6 miles down Crescent Creek to a cattleguard. Continue 1.95 miles to another cattleguard on the east edge of a large chaining (near section marker T 31S, R 11E, Sec. 29). On the north side of the road (NW of the cattleguard) there is a witness post out in the chaining. The transect starts with the 0-foot end of the baseline stake 500 feet to the west-northwest (275°M) at a short fence post tagged #7138.





Map Name: Raggy Canyon

Diagrammatic Sketch

Township 31S , Range 11E , Section 29

GPS: NAD 27, UTM 12S 4215029 N, 524674 E

DISCUSSION

Eagle Bench - Trend Study 15-1

The Eagle Bench site is located in a pinyon-juniper woodland type that was chained and seeded in 1968. The area is located at an elevation of 6,640 feet and gently slopes to the northeast. Precipitation data from Hanksville indicates that about 50% of the moisture for this area comes in the form of summer thundershowers during the months of July through October. Mean annual precipitation for the study area is at least 12 inches. Wyoming big sagebrush is the dominant key browse species for deer in the area. Scattered pinyon and juniper have been slowly becoming reestablished within the chaining, most averaging five to six feet in height. In 1999, point-center quarter data indicated that there were 64 juniper trees/acre and 67 pinyon trees/acre, both with an average stem diameter of 3 inches. Approximately 33% of the junipers sampled were large trees which were knocked over during the chaining, but still living. When sampled in 2004, all the pinyon and juniper within the chaining appeared to have been cut down within the past year. The site is located in the Crescent Creek Allotment which is managed by the BLM. Water for livestock and wildlife is available in Crescent Creek which is almost one mile south of the study area. Pellet group data from 1999 indicated light use with <1 deer and 9 cow days use/acre (2 ddu/ha and 22 cdu/ha). Pellet group data from 2004 continued to show light use with 8 deer and 2 cow days use/acre (20 ddu/ha and 5 cdu/ha).

The soil is a loam with a neutral pH (6.6). Parent material appears to be mostly granite with some sandstone. There is a considerable amount of rock on the soil surface and throughout the soil profile. The soil is reddish-brown in color and fairly shallow with an estimated effective rooting depth of just over 9 inches. Organic matter is low and appears to be limited to the area directly beneath sagebrush plants. The erosion potential is only moderate even with the sandy soils and moderate slopes of the area. Some pedestaling around the base of blue grama and sagebrush indicates that a certain level of erosion is occurring, but does not appear to be excessive. A nearby drainage has abundant litter and sagebrush in the bottom to prevent appreciable erosive cutting.

Wyoming big sagebrush is the most abundant shrub species in the area with an estimated density of 6,866 plants/acre in 1987, 6,400 in 1994, and 6,340 in 1999. In 2004 the sagebrush density was estimated 5,280 plants/acre. The majority of the sagebrush consist of mature plants (79% in 1987, 90% in 1994, 84% in 1999, and 73% in 2004). Biotic potential (proportion of seedlings to the population) has progressively decreased since 1987. It has gone from 17% to less than 1% in 2004. Percent decadency, has been below 10% through the years, however, but increased to 27% in 2004. Sagebrush leader growth and seed production were poor (average of 1.2 inches) in 2004. The Wyoming big sagebrush stems were very dry and brittle, with yellow leaves in 2004. Leaves were yellow. Many individuals showed poor vigor due to the lack of moisture. Broom snakeweed density was 1,960 plants/acre in 1994 and increased with each sampling date to 2,620 plants/acre by 2004. Percent young has remained constant since 1999 at about 36%. The population density has increased by 21% since 1999. This would indicate an expanding population in the future. Other species having low densities that were sampled in 2004 include green ephedra (stable) and slenderbush eriogonum (decrease of 94% due to drought).

The warm season increaser Blue grama continues to be the dominant understory grass. Blue grama has maintained a fairly constant quadrat frequency for the last 10 years, around 44% to 42%. Crested wheatgrass has decreased steadily since 1987 from 22% quadrat frequency to 1% quadrat frequency in 2004. The summer precipitation pattern and grazing program favors blue grama. It is the only warm season grass growing on the site other than galleta grass which was only sampled in 3 of the 100 quadrats in 2004. Between 1999 and 2004, sum of nested frequencies for all cool season perennial grasses declined significantly. Cheatgrass also decreased significantly in 2004. It was found in 1 out of the 100 quadrats in 2004. Forbs are rare. Total herbaceous cover in 2004 was low at less than 5%.

1987 APPARENT TREND ASSESSMENT

In 1987, ground cover appeared fairly good at 81%, but a good portion of this was either rock or pavement (39%). The sagebrush canopy cover, which was not estimated in 1987, appears to be about 16%. Grass and forb composition is poor, together they only make up 20% of the vegetative cover.

1994 TREND ASSESSMENT

Protective ground cover has declined slightly since 1987. Bare ground has increased slightly, while litter has declined by almost 40%. Total vegetative cover was estimated at 24%, but only 6% of this cover was composed of herbaceous plants which are much better at holding soil in place. Trend for soil is stable to slightly down and in poor condition. The browse trend appears stable due to a healthy, stable population of Wyoming big sagebrush. However, recruitment is poor. The herbaceous understory is lacking on this site. Combined, grasses and forbs make up only 23% of the total ground cover. Nested frequencies of grasses declined, while those of forbs increased. However, this forb increase cannot compensate for the losses for the grasses because the forbs only make up 27% of the herbaceous cover. Some of the increase for forbs may be due to the larger sample size taken in 1994. Overall, nested frequencies of grasses and forbs declined, indicating a slightly downward trend for the herbaceous understory. The winter range condition index (DCI) is a relative measure of the condition for this Wyoming sagebrush range-type. The site index for this area was determined to be in good condition. Refer to the methods section for a description of the process for determining condition of this range site.

TREND ASSESSMENT
soil - slightly down (2)
browse - stable (3)
herbaceous understory - slightly down and in poor condition (2)
winter range condition (DC Index) - 54 (good) Wyoming big sagebrush type

1999 TREND ASSESSMENT

Trend for soil appears stable with similar ground cover characteristics compared to 1994. Erosion appears minimal even with low herbaceous cover. Trend for browse appears stable for the key species Wyoming big sagebrush. Use is light to moderate, percent decadency relatively low at 9%, vigor is good, and recruitment appears adequate to maintain the current population. Herbaceous understory trend is slightly up. Sum of nested frequency for perennial grasses and forbs increased. The annual species component is insignificant for this community. The winter range condition index or desirable components index (DCI) is a relative measure of the condition for this Wyoming sagebrush range-type. It was determined for this site that it continues to be in good condition.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly up (4)
winter range condition (DC Index) - 57 (good) Wyoming big sagebrush type

2004 TREND ASSESSMENT

Trend for soil appears to be slightly improved with a decrease in bare soil and improved ratios of bare ground to protective cover. Erosion continues to be minimal even with low herbaceous cover. Even though minimal, through time (since 1987) percent rock cover has increased to now make up just over 40% of the ground cover. In 1987, it only made up 27% of the ground cover. Trend for the key browse (Wyoming big

sagebrush) appears to be going slightly downward because percent young (recruitment) has been decreasing steadily since 1987 (from 17% to <1%); percent decadence has been increasing since 1987 to where it is up to 27% currently; the percentage of plants classified as dying has increased 14%; the density has also decreased by 17% since 1999. Use is still considered light on 96% of the sagebrush plants. Herbaceous understory trend is slightly downward. Sum of nested frequency for both perennial grasses and forbs decreased. The annual species are still an insignificant component of the community. The winter range condition index or desirable components index (DCI) is a relative measure of the condition for this Wyoming sagebrush range-type. It was determined for this site that as described earlier in this paragraph, the index value has gone down to 44 (fair-good) because of losses in browse cover, increases in decadence, and decreases in percent young browse plants.

TREND ASSESSMENT
soil - slightly up (4)
browse - slightly down (2)
herbaceous understory - slightly down (2)
winter range condition (DC Index) - 44 (fair-good) Wyoming big sagebrush type

HERBACEOUS TRENDS --
Management unit 15 , Study no: 1

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
G	Agropyron cristatum	$_{b}$39	$_{b}$34	$_{b}$31	$_{a}$3	2.40	.68	.00
G	Bouteloua gracilis	$_{b}$196	$_{a}$122	$_{a}$113	$_{a}$109	1.53	1.87	3.15
G	Bromus tectorum (a)	-	$_{a}$3	$_{b}$15	$_{a}$1	.00	.05	.00
G	Hilaria jamesii	-	5	-	4	.01	-	.06
G	Oryzopsis hymenoides	$_{ab}$19	$_{b}$27	$_{b}$24	$_{a}$5	.11	.31	.01
G	Sitanion hystrix	$_{b}$109	$_{a}$36	$_{b}$84	$_{a}$49	.34	1.34	.60
G	Stipa lettermani	-	3	-	-	.00	-	-
Total for Annual Grasses		0	3	15	1	0.00	0.05	0.00
Total for Perennial Grasses		363	227	252	170	4.40	4.21	3.83
Total for Grasses		363	230	267	171	4.41	4.26	3.84
F	Arabis spp.	$_{a}$-	$_{a}$1	$_{b}$9	$_{a}$-	.00	.05	-
F	Aster spp.	$_{a}$-	$_{b}$26	$_{a}$-	$_{a}$-	.05	-	-
F	Astragalus spp.	$_{a}$-	$_{a}$-	$_{b}$14	$_{b}$13	-	.05	.02
F	Castilleja linariaefolia	-	-	-	1	-	-	.03
F	Calochortus nuttallii	-	5	-	-	.01	-	-
F	Chaenactis douglasii	-	3	-	-	.00	-	-
F	Chenopodium fremontii (a)	-	-	-	2	-	-	.00
F	Chenopodium leptophyllum(a)	-	-	-	1	-	-	.00
F	Collinsia parviflora (a)	-	$_{a}$-	$_{a}$-	$_{b}$14	-	-	.03
F	Descurainia pinnata (a)	-	-	6	3	-	.01	.00
F	Erigeron spp.	-	6	-	-	.01	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'94	'99	'04	'94	'99	'04
F	Eriogonum spp.	-	-	1	2	-	.00	.00
F	Gayophytum ramosissimum(a)	-	-	-	2	-	-	.00
F	Gilia spp. (a)	-	$_{b}$22	$_{ab}$16	$_{a}$6	.05	.04	.01
F	Hymenoxys acaulis	2	-	-	-	-	-	-
F	Lappula occidentalis (a)	-	-	-	1	-	-	.00
F	Lesquerella kingii	$_{a}$-	$_{a}$8	$_{b}$41	$_{a}$5	.01	.22	.04
F	Lupinus spp.	-	-	-	8	-	-	.02
F	Phlox austromontana	-	-	3	-	-	.18	-
F	Phlox longifolia	$_{a}$6	$_{b}$56	$_{b}$59	$_{b}$51	1.33	.18	.11
F	Polygonum douglasii (a)	-	4	10	-	.00	.01	-
F	Ranunculus testiculatus (a)	-	-	1	-	-	.00	-
F	Senecio multilobatus	$_{ab}$16	$_{a}$7	$_{b}$31	$_{b}$33	.02	.24	.18
F	Townsendia incana	$_{a}$-	$_{ab}$6	$_{b}$13	$_{ab}$4	.16	.03	.01
F	Unknown forb-perennial	6	-	-	-	-	-	-
Total for Annual Forbs		0	26	33	29	0.05	0.07	0.07
Total for Perennial Forbs		30	118	171	117	1.61	0.95	0.43
Total for Forbs		30	144	204	146	1.67	1.03	0.50

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 15 , Study no: 1

Type	Species	Strip Frequency			Average Cover %		
		'94	'99	'04	'94	'99	'04
B	Amelanchier utahensis	0	1	0	-	-	-
B	Artemisia tridentata wyomingensis	89	88	85	16.02	21.45	18.59
B	Ephedra viridis	0	1	1	-	-	-
B	Eriogonum microthecum	10	7	1	.06	.04	.00
B	Gutierrezia sarothrae	41	36	37	1.09	.28	1.24
B	Juniperus osteosperma	0	3	0	1.25	.63	-
B	Opuntia spp.	1	0	0	.00	-	-
B	Pinus edulis	0	5	0	1.87	2.24	-
Total for Browse		141	141	124	20.32	24.65	19.83

CANOPY COVER, LINE INTERCEPT --
Management unit 15 , Study no: 1

Species	Percent Cover	
	'99	'04
Amelanchier utahensis	-	.01
Artemisia tridentata wyomingensis	-	25.36
Gutierrezia sarothrae	-	1.00
Juniperus osteosperma	1.20	-
Pinus edulis	.40	-

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 15 , Study no: 1

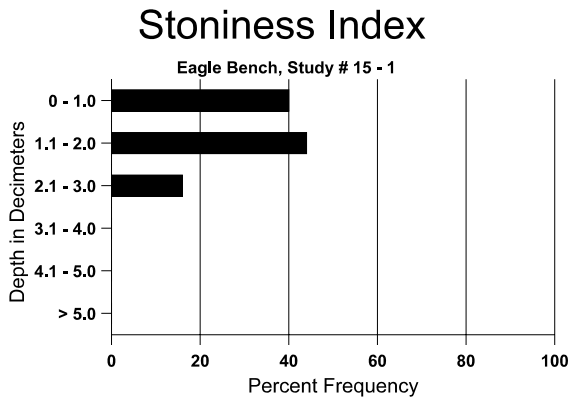
Species	Average leader growth (in)
	'04
Artemisia tridentata wyomingensis	1.2

BASIC COVER --
Management unit 15 , Study no: 1

Cover Type	Average Cover %			
	'87	'94	'99	'04
Vegetation	4.25	23.65	29.71	24.62
Rock	23.25	22.56	23.79	26.83
Pavement	16.25	4.56	13.64	16.85
Litter	37.50	22.97	24.80	25.20
Cryptogams	0	.03	.07	.09
Bare Ground	18.75	20.02	21.97	15.07

SOIL ANALYSIS DATA --
Management unit 15, Study no: 1, Study Name: Eagle Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
9.4	75.3 (14.0)	6.6	51.3	28.2	20.6	2.4	14.5	96.0	0.6



PELLET GROUP DATA --
Management unit 15 , Study no: 1

Type	Quadrat Frequency		
	'94	'99	'04
Rabbit	10	12	8
Deer	-	1	3
Cattle	-	2	-

Days use per acre (ha)	
'99	'04
-	-
1 (2)	8 (20)
9 (22)	2 (5)

BROWSE CHARACTERISTICS --
Management unit 15 , Study no: 1

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	-	20	-	-	100	0	-	-	0	46/61
04	**0**	-	-	-	-	-	0	0	-	-	0	50/57
Artemisia tridentata wyomingensis												
87	**6866**	133	1200	5400	266	-	87	5	4	-	0	18/27
94	**6400**	240	440	5740	220	-	0	0	3	.62	4	17/26
99	**6340**	220	480	5300	560	120	39	5	9	.94	2	17/30
04	**5280**	400	20	3860	1400	480	4	0	27	14	14	16/29
Ephedra viridis												
87	**0**	-	-	-	-	-	0	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	0	-	0	10/8
99	**20**	-	-	20	-	-	0	0	0	-	0	6/10
04	**20**	-	-	-	20	-	0	0	100	100	100	10/8

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Eriogonum microthecum												
87	**266**	-	200	66	-	-	25	0	-	-	0	3/3
94	**360**	-	180	180	-	-	11	17	-	-	0	3/3
99	**320**	80	40	280	-	-	31	13	-	-	0	3/4
04	**20**	-	-	20	-	-	100	0	-	-	0	4/5
Gutierrezia sarothrae												
87	**2466**	66	200	2266	-	-	0	0	0	-	0	6/4
94	**1960**	80	160	1740	60	-	0	0	3	-	0	5/6
99	**2080**	380	740	1320	20	60	0	0	1	.96	.96	3/3
04	**2620**	-	940	1540	140	80	0	0	5	5	5	7/10
Juniperus osteosperma												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**60**	20	60	-	-	40	0	0	-	-	0	-/-
04	**0**	-	-	-	-	20	0	0	-	-	0	-/-
Mahonia fremontii												
87	**0**	66	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-
Opuntia spp.												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**20**	-	-	20	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	4/10
Pinus edulis												
87	**0**	-	-	-	-	-	0	0	-	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**100**	60	40	60	-	20	0	0	-	-	0	-/-
04	**0**	-	-	-	-	60	0	0	-	-	0	-/-